Title: Data integration and assessment tools for TMDL development.

Sponsor: Utah Department of Environmental Quality, Division of Water Quality

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EXECUTIVE SUMMARY

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Environmental Setting / Problems:

The development of TMDLs for impaired waterbodies relies on the full utilization of numerous and varied sources of environmental data. This data is often stored in different databases and/or formats. To streamline the water quality assessment and TMDL process it is necessary to develop tools to access relevant data, integrate data into a usable format, facilitate modeling, and efficiently create water quality reports.

Major Goals:

Create an automated tool, or suite of tools, that can quickly access multiple sources of data and integrate data sets into a usable format for water quality data analysis and TMDL development.

Project Description:

This project will involve the development of software tools to access and integrate water quality and GIS data, assist in the analysis of the data, and facilitate the efficient management of data for TMDL assessment. The main product will be a customized software package designed to meet the programmatic needs of the Division of Water Quality. This project will include developing data transfer tools, a customized BASINS interface, a user's manual and training sessions. This is a continuing project, begun with 2002 funds, and will further develop tools within a BASINS customization package.

EPA Funds Requested: $50,000

DWQ Match: $2,500

Total: $52,500

Problem Description

The development of Total Maximum Daily Loads for impaired waters requires that all pertinent data be collected, formatted for compatibility, and managed independently for any given water quality analysis. This includes the use of many different datasets from various agencies in differing formats. As a result, much time is spent on accessing data and manipulating it to be compatible for integration into a usable dataset. In addition, TMDL analysis requires a variety of data types including STORET surface water quality, NPDES, USGS flow, groundwater data, climate, and a variety of GIS coverages from numerous sources and agencies. Ideally, water quality data should be gathered, formatted, and linked geographically in a GIS for ease of use and efficient analysis and report development. Given the tools available to the DWQ and the nature of available datasets, these tasks are performed manually through a time consuming process, usually without utilizing the full functionality of GIS tools. The following proposal further describes some of the needs of the DWQ and software solutions that have been developed by Tetra Tech and customized for other state and tribal agencies.

Project Goals

The main goal of this project is to complete the data integration and reporting tools to assist in water quality assessment and the development of Total Maximum Daily Loads. The resulting software solutions will involve the use of BASINS to streamline the acquisition of various data sources and facilitate water quality reporting and TMDL analysis. To achieve these goals, a contract with Tetra Tech, Inc. was initiated in October of 2002 and a web-based interface is being developed to assist in data extraction from the DWQ STORET dataset. The project description below describes in general terms the most likely solution to the DWQ's data management and reporting needs.

Project Description

The following project description is divided into two distinct tasks. Task 1 (currently underway) is the development of customized tools for data extraction, data analysis and reporting. Task 2 involves the customization of the USEPA BASINS (Better Assessment Science Integrating point and Nonpoint Sources) system to address Utah's DEQ specific data and functional needs.

Task 1a: This first task will include a series of meetings between DWQ staff and the contractor to refine and finalize the functionality of the final data management tools. An

analysis of the DWQ database, currently underway, will be necessary to determine whether additional data transfer tools will be required.

Task 1b: Once the functionality requirements are determined, work will proceed in the development of browsing, editing, query, report, and data transfer tools that can be used to query Utah DWQ's water quality database and. One specific provision of this functionality may be an export tool allowing the update of water quality data in the BASINS system. In addition, the reporting and graphing capabilities of Excel to perform analysis and common tasks will also be included.

Task 2a: This task would include identifying specific data and functional requirements for the customized BASINS system. This can be achieved either through a series of meetings with key staff of the different programs that are expected to benefit from this system. Past BASINS customizations performed for other states will be reviewed to help facilitate the identification of functional features that may be needed for the State of Utah.

BASINS is an ArcView-GIS-based system that is widely used to assist EPA and the states in performing watershed assessment and modeling to support water quality programs such as the TMDL program. The BASINS customization will include the incorporation of local data sets, and enhancing existing tools, or developing new tools. Data sets stored in different formats can be integrated with BASINS, which normally stores its data in ArcView shapefiles and DBF files. Similar BASINS customizations have been completed for other states.

Preliminary inventory of data types in the BASINS system indicates that more site-specific and recent versions may be available in the State of Utah. These include but are not limited to:

- Watershed Boundaries (11 and 14 digit watersheds)
- Land use
- Soil
- National Hydrographic Data (NHD)
- Roads
- Dams
- Mines
- NPDES
- Water quality monitoring
- Flow
- Weather data

Other data sets that are not in BASINS such as Agricultural Census data, data from state and federal managed lands, and other agencies may be included if feasible.

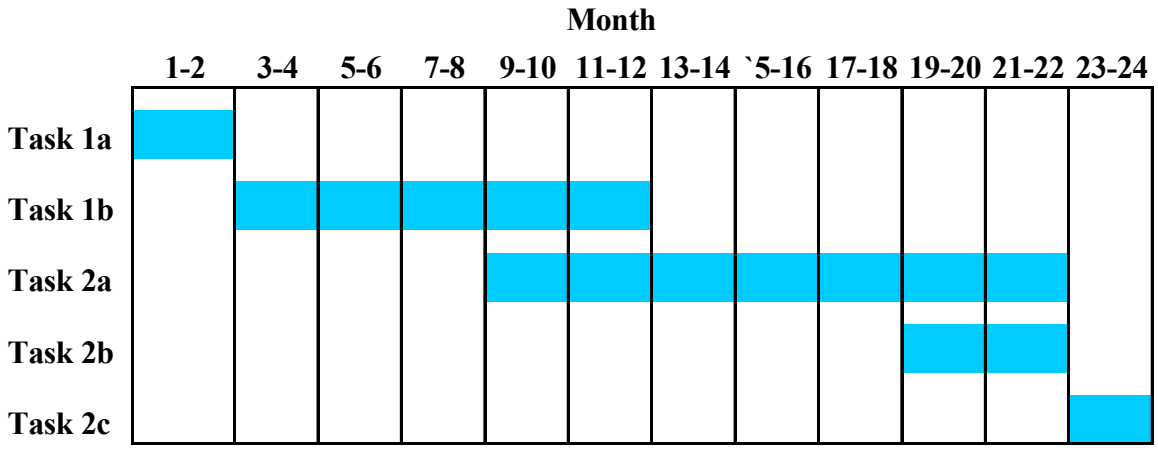
Task 2b: This task involves implementing the final detailed design and requirements document through programming, testing, and debugging. Code fragments from the BASINS system and BASINS customization will be adopted as deemed appropriate.

Task 2c: Training in the use and functionality of the customized tool's will be provided in training sessions for DWQ staff. A user's manual will also be prepared. Additional tasks may include applying the customized system to case studies to demonstrate its use and also to train key people in the use of it.

Outputs and Project Reports

The final product of this project will be a customized and integrated software package for DWQ use in the development of TMDLs and water quality analysis. It will include all components required by DWQ staff and negotiated with the contractor. Interim meetings and/or reports will be required to facilitate the design process and update the DWQ on task progress. A customized user manual and training session will also be provided.

Milestones



Budget

The following breakdown of projected costs is an estimate based on similar projects completed for other states with assistance from EPA and their contractor TetraTech. Certain work elements may be required on an "as needed" basis (see Task 1). Initial discussions with the contractor will determine the needs of the DWQ programs and the

appropriate software solutions. These discussions may result in refinement of project costs.

TASKS	EPA Funds	DWQ Funds
1a: Determine needs and tool functionality.		**$2,500**
1b: Development of browsing, editing, querying, reporting, and data transfer tools	**$50,000**	
2a: Customization of BASINS and database tools	**$32,000***	
2b: Final design programming, testing and debugging	**$15,500***	
2c: Training and user manual development	**$2,500***	**$2,500**
Total	**$100,000**	**$5,000**

Total Project Cost : $105,000
*2003 requested funds